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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

GEORGE POLITIS

Application No.: 09/387,569

Filed: September 1, 1999

For: REGION BASED IMAGE
COMPOSITING

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Examiner: M. Good-Johnson

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Group Art Unit: 2672

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:
December 5, 2001

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DEC 27 2001

Technology Center 2600

Commissioner for Patents
Washington, D.C. 20231

REQUEST FOR RECONSIDERATION
AND PETITION FOR EXTENSION OF TIME

Sir:

Applicant petitions to extend the time for response to the Office Action dated July 5, 2001 to and including December 5, 2001. A check in the amount of \$400.00 for payment of the extension fee is enclosed. Please charge any additional fee required for the extension, and credit any overpayment, to Deposit Account 06-1205.

In response to that Office Action, Applicant respectfully requests consideration in view of the following remarks.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first-class mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on

December 5, 2001

(Date of Deposit)

Leonard P. Diana

(Name of Attorney for Applicant)

Signature

December 5, 2001

Date of Signature

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This application has been reviewed in light of the Office Action dated July 5, 2001. Claims 1-72 remain pending in this application. Claims 1, 14, 25, 38, 49, and 62 are in independent form. Favorable reconsideration is requested.

The Office Action rejected Claims 1-72 under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,008,820 (Chavin et al.).

Applicant respectfully traverses the rejection of Claims 1-72 for the following reasons.

The aspect of the present invention set forth in Claim 1 is a method of creating an image. The image is to be formed by rendering and compositing at least a plurality of graphical objects, each object having a predetermined outline. The method comprises the steps of, firstly, dividing a space in which the outlines are defined into a plurality of regions, each region being defined by at least one region outline substantially following at least one of the predetermined outlines or parts thereof and being substantially formed by segments of a virtual grid encompassing the space. Secondly, the regions are manipulated to determine a plurality of further regions, with each further region having a corresponding compositing expression. Thirdly, the further regions are classified according to at least one attribute of the graphical objects within the further regions. Fourthly, each of the corresponding compositing expressions are modified according to a classification of each further region to form an augmented compositing expression for each further region. Finally, the image is composited using each of the augmented compositing expressions.

Chauvin et al., as understood by Applicant, relates to a circuit device called

a gsprite engine that controls the display of image layers called gsprites and a method for controlling the display of these gsprites and for controlling the gsprite engine. Apparently, Chauvin et al. mentions, at Figure 15C, element 558, 'dividing a space in which said outlines are defined into a plurality of regions . . . formed by segments of a virtual grid encompassing said space'. Chauvin et al. also refers, at Figure 15C, with reference to elements 564 and 566, to 'manipulating said regions to determine a plurality of further regions, wherein each said further region has a corresponding compositing expression'.

Chauvin et al. states at column 31, lines 36 to 67 with reference to Figure 15A, that a bounding box drawn around an object 546 is expanded to 32 X 32 pixel boundaries referred to as 'chunks', as seen in Figure 15B, to form a 'gsprite' 552. In making the rejection of Claim 1, the Office Action appears to equate these bounding boxes with the "regions" of Claim 1. However, as described at page 7, lines 13 to 18 of the present specification, the basic shape of operands to compositing operators in most current systems is the rectangle, regardless of the actual shape of the object being composited, and it is extremely easy to write an operator which composites within the intersection area of two bounding boxes. The present specification further states that, as a bounding box typically does not accurately represent the actual bounds of a graphical object, this method results in a lot of unnecessary compositing of completely transparent pixels over completely transparent pixels. Therefore, Chauvin et al. teaches directly away from the method of Claim 1.

Further, Chauvin et al. states that the 'chunks' are rectangular and most preferably square (i.e., regular) (see column 31, lines 51 to 55). Still further, as seen in Figure 15C of Chauvin et al., a graphical scene 558 is formed by a grid containing a

number of overlapping objects 560 and 562. The objects 560 and 562 are enclosed in bounding boxes and are assigned to gsprites 564 and 566. However, as seen in Figure 15C, the gsprites 564 and 562, which appear to be what the Office Action is equating with the virtual grid recited in Claim 1, do not encompass the space in which the objects are defined. There is no relationship between the objects 560 and 562 and the grid 558 which may be said to encompass the space in which the objects 560 and 562 are defined. Further, there is no relationship between the gsprites 564 and 566 and the grid 558 which encompasses the space in which the objects are defined.

In contrast, as stated at page 8, lines 19 to 25 of the present specification, irregular regions are used to minimize per-pixel compositing. Further, as stated at page 9, lines 4-27 of the present specification and as recited in Claim 1, each of the objects has a predetermined boundary outline and each of the regions is defined by at least one of these predetermined boundary outlines or parts thereof. Figure 3 of the present specification shows the regions (1-10) produced using five objects A-E, and the compositing expression which would be used to generate the pixel data for each specific region. For example, the region 10 is defined by the outline of object D in conjunction with the object E, and the compositing expression 'D over E' can be used to generate pixel data for the region 10. Thus, the regions outlines follow the predetermined boundary outlines of the objects, as closely as possible. However, as stated at page 16, lines 5 to 12 of the present specification, if region boundaries follow object boundaries very closely, a lot of work is usually involved in creating the region boundaries and in performing intersections and differences of regions. Therefore, as stated at page 16, lines 18 to 22 of the present specification, to improve the efficiency of region operations, as many as is practical of the

horizontal and vertical segments of substantially all region boundaries are chosen to be in phase. In other words, the horizontal and vertical segments are to be chosen from the horizontal and vertical lines of the same grid. As recited in Claim 1, the predetermined outlines are substantially formed by segments of a (i.e., one and the same) virtual grid encompassing the space in which the outlines are defined. As described at page 16, lines 32 to 34, the grid aligned regions yield less detailed results at the expense of slightly less efficient region coverage, but result in less work when creating the region boundaries and in performing intersections and differences of regions.

Applicant submits that Chauvin et al. in general and particularly with reference to Figure 15C, does not teach or suggest the particular feature, recited in Claim 1, of dividing a space in which the outlines are defined into a plurality of regions, each region being defined by at least one region outline substantially following at least one of the predetermined outlines or parts thereof wherein the regions are formed by segments of a virtual grid encompassing said space.

The Office Action further contends that Chauvin et al. discloses at Figure 15C, with reference to elements 560 and 562, classifying further regions according to at least one attribute of the graphical objects within the further regions.

Chauvin et al. states at column 31, lines 56 to 67, that the graphics scene contains a number of overlapping objects 560 and 562 and that these objects are enclosed in bounding boxes and are assigned to gsprites 564 and 566. Column 8, lines 23 to 27, that pixels in a gsprite have color and alpha information associated with them, so that multiple gsprites can be composited together to create the overall scene. Further, at page 16, lines 60 to 65, Chauvin et al. states that the image processor converts gsprites to output device

coordinates based on gsprites in a display list. The image processor reads gsprite data from shared memory, including color, alpha, and data identifying the gsprite's position. Based on this data, the image processor determines the color and alpha for pixels covered by the gsprite. However, nothing has been found in Chauvin et al., particularly but not only with reference to Figure 15C, in regard to classification of the regions 564 and 566 according to attributes of the objects 560 and 562 within respective regions.

In contrast, as described at page 10, lines 8 to 25 of the present specification, with reference to Table 1 of the specification, if an attribute such as opacity of the objects is used to simplify the compositing expressions for each region, the expressions of Figure 4 are obtained resulting in a simplification of the rendering of regions 2, 3, 5, 6, 7, 8, and 9 compared with Figure 3. These simplified compositing expressions result in far fewer pixel compositing operations being performed to produce a final image.

Applicant submits that nothing has been found in Chauvin et al. that would teach or suggest the feature, recited in Claim 1, of classifying said further regions according to at least one attribute of graphical objects within the further regions.

The Office Action further contends that Chauvin et al. discloses at Figure 7, with reference to element 310, the step of 'modifying each said corresponding compositing expression according to a classification of each said further region to form an augmented compositing expression for each said further region'.

Chauvin et al., as understood by Applicant, states at column 14, lines 3 to 36, that the method determines potentially visible objects based on the view of volume. The view volume is defined as a three-dimensional space in world coordinates that

provides the boundaries for a scene. The preprocessor selects potentially visible objects by traversing objects and determining whether their boundaries intersect the view volume. Objects that intersect the view volume are potentially visible in the geometric or spatial sense. Further, as discussed above, column 15, lines 49 to 59, states that one object is preferably assigned to a gsprite. However, more than one object can be assigned to a gsprite, for example, to accommodate processing constraints of a particular image processor being used. The method of Chauvin et al. sorts objects in Z-order, i.e., in distance from the viewpoint. In addition to sorting objects, that method sorts gsprites in depth order as well as stores this depth data in gsprite data structures.

Further, at column 16, lines 49 to 59, Chauvin et al. mentions that a display list is used to determine the gsprites to be displayed in the current frame. While that display list is processed 312, gsprite transforms are computed and a display list is constructed for a next frame 314. In the next frame, the gsprite transforms and display list that were generated in the previous frame 314 are then used to generate the display image 316. The image processor converts gsprites to output device coordinates based on the list of gsprites in the display list. The image processor reads gsprite data from shared memory, including color, alpha, and data identifying the gsprite's position. Based on this data, the image processor determines the color and alpha for pixels covered by the gsprite.

In contrast, as described at page 10, lines 8 to 25 of the present specification, the compositing expression for a final image is simplified dependent whether the graphical objects being composited are wholly opaque, wholly transparent or otherwise (i.e., the classification of the objects within the regions). As shown in Table 1 of the present specification, a wholly opaque object in a region acts to eliminate one or more

objects within that further region from the corresponding compositing expression for that region.

Applicant submits that nothing has been found in Chauvin et al. that would teach or suggest the feature, recited in Claim 1, of modifying each corresponding compositing expression according to a classification of each further region to form an augmented compositing expression for each further region.

Accordingly, Applicant submits that Claim 1 is clearly allowable over Chauvin et al.

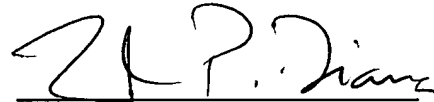
Independent Claim 14 recites features similar to those discussed above and is believed patentable for at least the reasons developed above with respect to Claim 1. Independent Claims 25 and 38 are apparatus claims, and independent Claims 49 and 62 are computer program product claims, corresponding to Claims 1 and 14, respectively, and are believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

The other claims in this application depend from one or another of the independent claims discussed above, and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual consideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,



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